

Throwing out the flashcards: The effects of the keyword method and technology on foreign language vocabulary acquisition

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Introduction

A source of frustration in my Spanish classrooms definitely has been vocabulary acquisition. Vocabulary is a vital component of a foreign language classroom. Students cannot do anything in a language– read, write, listen, or speak – without first knowing the vocabulary of that language. My daily frustration comes from the archaic method that I employ to increase vocabulary knowledge of students. Utilizing flashcards is a fast, easy method of vocabulary learning for me to perform with my students. It does seem to be beneficial to some students. However, I have noticed that a majority of my students are not fully engaged in the process. At the end of each unit, their test scores reflect that lack of engagement.

In search of a meaningful alternative, I did research on a new method with which to teach vocabulary. Because of an increased demand from administration, I wanted my new method to utilize technology in some way. I also wanted to find a new method that focused on developing my students' cognition, as well as be a method that helped increase vocabulary retention in both the long- and short-term. My searches led me to something called the keyword method. The keyword method, first developed by Atkinson (1975), utilizes a method of connecting a word in Spanish to a word in English that is phonetically similar. Then, an image or a sentence is created to connect the phonetically similar English word to the definition. An example of this would be the word *playa*. *Playa* appears similar to the word “play” in English, and it means “beach.” A way to connect the words “play” and “beach” would be the sentence: “I like to play on the beach.” Another way to connect the two words would be to show a picture of someone playing on the beach.

While conducting my research with the keyword method, the model that I followed was Lewin's Action Research Spiral (seen in Figure 1) (Smith, 2001). I chose this model because of its clear steps, as well as the fact that the model only shows one complete action research cycle. Other research models typically showed a few different cycles of action research, which I found to be distracting. The action research detailed in this paper is one complete cycle of work, so I felt the model was accurate.

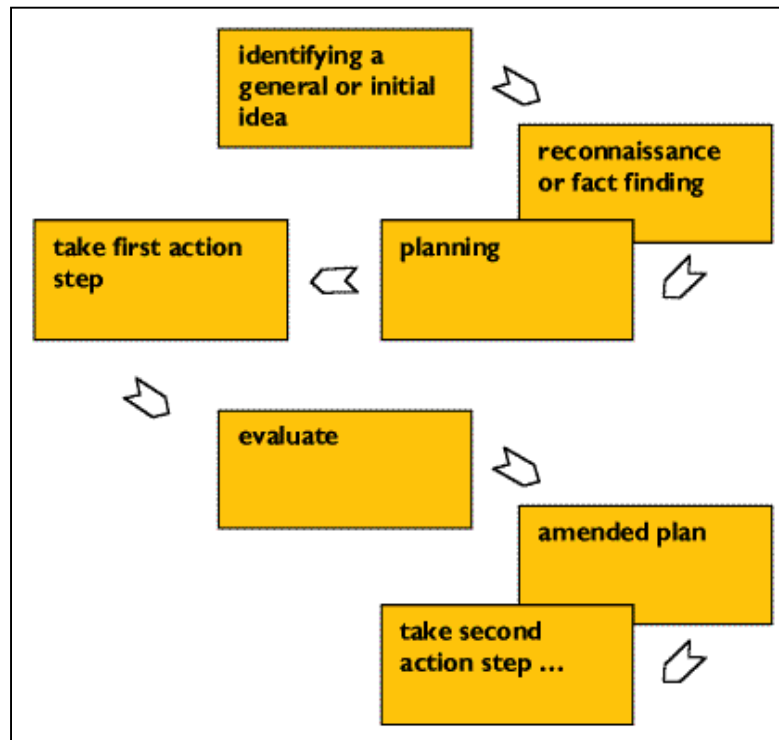


Figure 1. Lewin's Action Research Model.

Following this model of action research, I completed several steps to finish my research. In the following sections, I provide a thorough explanation of the following areas: area of focus, research question, review of literature, intervention/innovation, membership of the research group, negotiations undertaken, timeline of the research project, data collections and analysis, findings,

and action planning. As stated above, the next section is the area of focus statement.

Area of Focus Statement

The purpose of this study was to determine what effect the keyword method had on Spanish II students after repeated exposure in a digital format for nine days. Atkinson's (1975) keyword method has been shown to improve long-term retention of foreign language vocabulary in students. Before this study, my students had only been exposed to rote memorization, also known as the flashcard method. Through this study, I explored how the keyword method altered the ability of my students to learn and remember the vocabulary for a chapter. This interest in the keyword method led me to my research question.

Research Question

Finding the keyword method led me to the formation of my research question: How does repeated exposure to vocabulary via digital keyword method presentations impact students' retention of vocabulary words in a high school Spanish class?

Review of Related Literature

Introduction

This literature review examines several facets of the acquisition and retention of a foreign language, and focuses on four specific areas. The first area examines foreign language acquisition. Understanding how students obtain a foreign language helps to understand how the keyword method works. Second, I reviewed research on foreign language cognition and retention of vocabulary. Because it is a main aspect of my research, I also reviewed several articles on the keyword method, to

examine specific research methods. I wanted to examine the types of research conducted in the past and if I could improve upon that research. I was also interested in finding ideas to use in my own experiment. Finally, I examined the role of technology in the acquisition and retention of foreign language to understand the benefits as well as the problems with technology so that I am better prepared to use it during my research.

Foreign Language Acquisition

Breaking down the research to its core, this study involved conducting research on the acquisition of a foreign language. Language acquisition is something that has been researched for a very long time, but foreign language acquisition is a somewhat newer field. For a long time, researchers believed that foreign language acquisition could be done in a similar fashion to how one learns a first language. First language acquisition occurs at an extremely young age due to prolonged daily exposure to the language. Schmidt (1993) explains that young children learn language both unconsciously and unintentionally because they are simply trying to communicate with those around them. This leads researchers to wonder if older learners of a second language should be at all concerned with grammar, or merely focus on learning how to communicate meaning.

It has come to be seen that purposeful and concerted learning of a language at an older age is more beneficial than the more natural learning environment of the first language. In one study, Schmidt (1993) found that “89 percent of the items that the respondents claimed to have seen and learned during the lesson had been focused upon during instruction, given prominence by being, however briefly, the

ostensible topic of conversation rather than simply a part of classroom discourse” (p. 212). Because the students became explicitly aware of what they were learning, they were able to recall later the material that they went over. This research illustrates that presenting vocabulary to students is better than having students learn the vocabulary by reading or just picking up the word from glancing at it.

The focus of language building has also been a controversial one. What does it really mean to even know a word? Brown (2010) reveals that there are nine different aspects of vocabulary knowledge, which range from form and meaning to constraints on the usage of a word. While Brown (2010) claims that it is important to know all different aspects of a vocabulary word to have a full grasp of a foreign language, this notion is found nowhere else in the research. While understanding all aspects of a vocabulary word is somewhat important, it is also important to note that in first language, a person typically does not know all aspects of a vocabulary word right away. Rather, knowledge of a word increases as usage of the word increases.

Some believe that an understanding of culture can aid with the acquisition of a second language. Citron (1995) believes that in order for a student to acquire the nuances of a language, understanding the culture in which that language is cultivated is also important. For example, the idea of two different forms of the word “you” in English appears somewhat awkward and repetitive, but in Spanish there is a need for two forms because of a desire to show respect to different types of people. Citron (1995) admits that this type of teaching culture infused with grammar and vocabulary has its challenges in a normal classroom, but suggests that

the teacher simply prepares the students before learning something new in the other language by encouraging them to step out of their English brain and into their Spanish brain.

As the vocabulary of a language is learned, questions come to mind about where and how that information is organized in the brain. Our brains typically store all of the information about language in what is known as a lexicon. One thing that has divided researchers is how the mind stores a foreign language. There has been some argument about whether all information, regardless of language, is stored in one large lexicon, or if the mind creates a separate lexicon for each language learned. A large amount of research has been conducted in the area, but Kroll and Sunderman (2003) have concluded that no matter the number of lexicons a person may have in his or her mind, a person has the ability to access both lexicons. In fact, people do access both when working in a foreign language that is similar to their own. This means that knowledge of the English language is helpful in learning other languages.

It seems that purposeful and intentional vocabulary acquisition, while not the most natural way to learn a language, is the best type of education for a classroom. Citron's (1995) research seems to run counter to that of Kroll and Sunderman (2003), simply because Citron (1995) is stating that one should move past the constraints of the English language in order to learn a foreign language, while Kroll and Sunderman (2003) state that the two lexicons are completely intertwined in each other. Regardless of which one is correct, access to any type of lexicon is only made possible through cognition of a foreign language and retention of that

language.

Cognition and Vocabulary Retention

Aspects very closely related to foreign language acquisition are cognition and vocabulary retention. Cognition of a foreign language relates to how the brain understands information relating to a foreign language as it is received, which in turn leads to how it is retained in one's memory. These two areas are key to this research, because it is imperative to lead students to a specific type of cognition as it relates to vocabulary, which will then lead students to retain the vocabulary for a much longer time and in a larger quantity. Students should make deep connections to the vocabulary so that they develop a true understanding of the words they are learning.

In the area of cognition, Erbes, Folkets, Gergis, Pederson, and Stivers (2010) delved deep into the issue as it relates to acquisition and retention in the classroom. They examined how students were able to remember words based on a few different methods, including rote repetition and deeper processing. While the results of this study were positive for deep processing methods, one important finding was the impact that the teacher had on the scores in the classroom. One classroom had a teacher with less experience who had a lot of classroom management issues, and that greatly impacted the scores of his students on retention of vocabulary words. It can be assumed that the "noise" created in that classroom led to a disruption of the learning environment, and prevented the students from deeply processing the new vocabulary as the students in the other classroom did.

Elgort (2011) found that thematic clustering aids in cognition of vocabulary words, as well as retention. The reasoning behind this is because all words can be grouped together under one broad heading, and thus all words learned share a similar set of background knowledge when recalling a word. Elgort's (2011) findings are important because of the way that some textbooks are set up. Typically, textbook chapters are broken into vocabulary that has a particular theme or themes to it. For example, many foreign language textbooks include chapters with vocabulary themed around food, clothing, and sports. Knowing that students mentally will put all of this vocabulary under one group helps a teacher to visualize potential connections among words in a chapter.

Elgort (2011) also discusses intentional and unintentional learning in regards to retention. Elgort (2011) cites the benefits of each type of learning, and has concluded that intentional, or conscious, learning of vocabulary increases retention of said vocabulary. Brown and Perry (1991) concur with this statement, going so far as to say that retention of vocabulary is entirely dependent on depth of which the information is processed. As a subject works with vocabulary at deeper and deeper levels, that subject is more likely to retain the vocabulary than someone who has just a momentary (or shallow) processing of the word. The idea of shallow processing is similar to a person glossing over a word in a piece of literature.

Elgort (2011) also examined the prospect of using flashcards to provide long-term retention of foreign language vocabulary. Final results found that subjects understood and stored words learned exclusively through flashcards into their long-term memory. One caveat to the conclusions is that additional methods, such as the

semantic mapping or keyword methods, may provide a better way for students to learn vocabulary as they require deeper processing. Other authors (Brown & Perry, 1991; Lawson & Hogben, 1996) have also found that flashcards, keyword method, and semantic method are in fact more helpful than learning vocabulary within the context of a story or text. Lawson and Hogben (1996) also reviewed a technique that is quite commonly used in classrooms by students. The “self testing” procedure is performed when a student covers up the meanings of words and then tests him or herself to recall the covered word based on the uncovered word. While this task is similar to the flashcard method, it is different because students may see a long list of words at once, allowing them to eliminate some options based on words that they may look further down the list. Research showed that this method of learning provided slightly better results than flashcards and context methods (Lawson & Hogben, 1996).

Schmitt (2008) believes that using several activities is key to the retention of vocabulary, as opposed to only one method. Throughout his research, Schmitt (2008) developed a long list of activities that he believes are helpful to vocabulary retention. A few of the activities of interest include:

- Using a new vocabulary word in a constructed sentence after receiving the meaning
- Placing words into categories such as types of words or groups based on definitions
- Recording new words into a notebook along with definitions and other helpful “cues” for each word

Essential in all of his suggestions is the fact that these words must be rehearsed in a way that connects the meaning with the word. Gu (2003) agrees that the key to learning new vocabulary comes with both knowing and using the word in several different contexts. Gu (2003) further found that several repetitions are not even necessary for students to recall a word. He reported that word pairs can be learned in between one and six repetitions.

Masoura and Gathercole (2005) may have conducted the most compelling research on the matter of foreign language retention. They found that students tend to better retain words that have at least one syllable similar to a word that they already know. These words did not have to mean the same thing. Furthermore, they found through research that using pictures to learn new words also aids retention. This research essentially supports the basis of Atkinson's (1975) keyword method.

As a last, somewhat quirky, note on foreign language retention, Rampton (2002) reported that use and retention increased for German language students when they found the words to be useful outside of the classroom. These students utilized words both in conversations with each other outside of classes, as well as in other teachers' classes. Rampton (2002) also noticed an increase in retention of words that were phonetically unique. An example of this is the word *sacapuntas* in Spanish, which means "pencil sharpener". While relatively useless to most conversations in Spanish, it is a word that is very memorable because of its phonetic uniqueness. Keying into the phonetics of a word is important to aiding students with vocabulary cognition and retention. The keyword method does just that.

Keyword Method

Atkinson (1975) devised the keyword method to increase retention of foreign language vocabulary after limited interaction with the words. In his initial research, he discovered that both immediate recall and delayed recall increased with the use of the keyword method. This method begins with the inclusion of imagery linked to keyword method. In fact, Atkinson noted that, "Imagery instructions have a significant advantage over sentence-generation instructions when using the keyword method (73% versus 64%)" (1975, p. 825). This inclusion of images in the first trials of the keyword method is intriguing. Not only did Atkinson (1975) find success in the method, he also saw increased success when images were also used.

Thomas and Wang (1996) confirmed similar findings to those of Atkinson (1975). They witnessed significant increases in recall when subjects learned not only a keyword, but also when the keyword and definition were brought together in picture form. They further stated that the images should be shown to the subjects instead of simply imagined by the subjects. In this way, there is consistency of image, and all subjects perceive the same thing.

Atkinson's (1975) initial research on the keyword method has been duplicated and altered in several different ways over the past 35 years. Raugh and Atkinson (1975) found that the keyword method produced better recall results than what is known as the rehearsal strategy. Although the experiments revealed success in the method, it also revealed flaws in selecting what keywords to use. In these experiments, the subjects chose the keywords. Raugh and Atkinson (1975) suggest that a committee of people rather than the subject or one researcher should choose the keywords.

Several years later, Thomas and Wang (1996) conducted an experiment to investigate if subject-generated keywords helped to increase retention of the vocabulary. Their findings were consistent with those of Raugh and Atkinson (1975) in that the user-generated keywords led students to perform worse than students using a typical memorization-type method of learning the words. Brown and Perry (1991) add another requirement of the keyword to the discussion, saying that the keyword in the first language must have at least one syllable that is acoustically the same as the word in the foreign language.

Other researchers could not always duplicate the success of these early studies on using the keyword method. Hall (1988) created an experiment testing the ability of the keyword method to improve retention among students versus a rehearsal method. Throughout several trials, he found that students who utilized a normal rehearsal method typically performed a little better than students who worked with the keyword method. While his results did not show a massive difference between the scores of the two groups, he saw no real benefit of one over the other. One interesting insight from his research, though, is the attitude of the participants towards the keyword method. Once he told the subjects that they did not perform any better on the test, they were surprised. The fact that they did not do better did not lead the subjects to forget the method. All subjects stated that they would use the keyword method again, but would alter it to make the method more personal to them and the situation.

Other researchers also could not find unlimited success with the method. One study conducted found that immediate recall after the keyword method was much

worse with subjects exposed to the method than those in the control group (Campos, González & Amor, 2003). In other experiments from Campos, González and Amor (2003), it was found that the delayed recall of the keyword and control groups was similar. These results indicate that while in the short-term the keyword may have been harmful, the long-term results were consistent with the control group.

One thing that has varied significantly throughout all of the studies is the length of which the keyword method is used. In some studies, the keyword method was used for a day or two for the students to learn the words. In others, (such as Thomas & Wang (1996), Raugh & Atkinson (1975), Sagarra & Alba (2006) and Lawson & Hogben (1998)) the method was used for a couple of days. In one study, the keyword method was promoted sporadically with the participants for four weeks (Hall, 1988). Most of these studies are performed on college-aged students or adults for the duration of a few days. Only one study conducted by Pressley (1977) utilized young children. The participants in all of the studies are then tested in different intervals of time immediately after the study and some days later. This in no way shows how the keyword method will perform in a typically structured classroom. Even studies conducted under so-called classroom conditions really do not emulate true conditions of a high school classroom. Another thing that none of the keyword method studies have utilized is technology, which is becoming more prevalent in foreign language classrooms.

Technology

Utilizing technology in foreign language acquisition is something that is

becoming more and more popular. One of the most popular methods for technology utilization is called Computer Assisted Language Learning (CALL). CALL can honestly encompass several different aspects of learning a foreign language. Typically with CALL, students read passages in the foreign language with the help of a programmed glossary. Depending on the type of glossary used, the program may contain images to help the reader derive meaning, as well as translations from first to second language, or even definitions entirely in the second language (Abraham, 2007; Ellis, 1995; Grace, 2000; Rüschoff & Ritter, 2001). The use of CALL for vocabulary acquisition has had mixed results.

In her research into CALL technologies, Constantinescu (2007) found through case studies that students who utilized the CALL software outperformed a control group in vocabulary knowledge, reading comprehension, and reading speed. The researcher goes on to conclude that a good computer program will utilize both pictures and words to develop vocabulary. In a study initially conducted to determine gender differences in the effectiveness of CALL, Grace (2000) found that both genders benefitted equally from the use of computer glossaries. She also learned about what types of glossaries were the most effective. Through her research, Grace (2000) determined that glossaries that provided direct first-to-second language were best, over glossary entries that were fully written in the second language.

With several different options for the display of vocabulary, several studies have been conducted as to the type of CALL being examined. A review of current technologies by Salaberry (2001) comments on the usefulness of computer-aided

instruction in the classroom. He claims that despite much research on the benefits of CALL, much of the research conducted has been collected with surveys of attitude and descriptive accounts, instead of through quantitative means. Although some studies (Abraham, 2007; Grace, 2000, Rüschoff & Ritter, 2001) contradict this finding, it seems that utilizing technology in the learning of a second language is something that needs further research to confirm the validity of use in a classroom everyday. As Ellis (1995) states, no matter the strategy, CALL has a useful role to play in promoting vocabulary acquisition, because of the instant nature of technology. Chapelle (2007) discusses not only the capabilities of CALL as a way to gain vocabulary knowledge, but also as a way to communicate. Using the Internet and other technologies, Chapelle (2007) states that a person can learn to negotiate meaning based on the context of what is being said in real time.

Many of the CALL investigations were presented within the context of reading comprehension. Ellis (1995) claims that most vocabulary acquisition comes from contextual reading, which is why he finds CALL so appealing. He feels that readers are at their highest point of acquisition when they are both learning from context and from electronic glossaries. Abraham (2007) agrees with this assertion. He states that the ability to see the word within a context is important in creating a definition. One downfall to creating a definition claims Abraham (2007) is the fact that readers may create their own definition that is close to the real definition, yet fundamentally inaccurate. This is also an issue with picture glossaries and definitions in a foreign language. They may be misinterpreted, leading to incorrect definitions.

Rüschoff and Ritter (2010) look ahead to a future classroom that uses CALL

and other technologies in teaching a foreign language. They see the classroom as being one built on constructivism, where students would work on their own materials at their own pace to discover learning. Rüschoff and Ritter (2010) see this as a classroom where the learners spend a majority of their time reading authentic texts and completing task-based performance reviews. They feel that this learning will enhance vocabulary retention and understanding of the language. Because this type of learning would be self-paced, the two see foreign language classes occurring exclusively via computer.

It appears that these researchers are overall impressed with the results of CALL and the promise of technology providing instant access to endless vocabulary for students. Thinking even further into the future, Rüschoff and Ritter (2010) envision a classroom where students learn foreign language exclusively online. The literature reviewed, however, shows only the present-day limitations of CALL, which show only vocabulary acquisition as it relates to reading comprehension.

Conclusions

I believe that researching these four different topics has provided a solid foundation for which I conducted my research. Understanding how a student comes to acquire knowledge, and how that information is stored and remembered in the brain helped me to key into best practices to increase the size of my students' vocabulary and memory. I believe that the keyword method provided for deep processing so that my students retained the vocabulary learned into their long-term memory.

I am also highly encouraged by the idea of a shared lexicon among languages

inside the brain. Making connections between the English language and Spanish language was extremely useful in increasing my students' knowledge with the keyword method. Learning about research conducted on the keyword method has helped me to understand what conditions researchers have used before, as well as provided ideas for data collection and methods for my own research. I believe some of the studies conducted were better than others. I hope that in my own research, I was able to accurately reflect how the keyword method performed in a high school classroom. The research on technology, while not totally fitting in with what I did with my project, finally allowed me to see what other people are doing in regards to technology and foreign language. I did see the potential benefits of using technology in my research. I think that the biggest benefit of technology is the ability to share and to get instant access to information. All of this information, including some not mentioned in this review (see Appendix A for full list), influenced the innovation that I created for my classroom. Keeping all of this information in mind, I was able to create a quality intervention to use with my students.

Intervention/Innovation

Because the research seemed so compelling towards the keyword method, I believed that was my best choice to replace flashcards in my daily routine in my Spanish II classes. Before learning about the research, I had actually used the keyword method in my classroom for selected vocabulary words. For words that were difficult for my students to remember, I tried to give them a visual with which to connect it. I used an example just weeks before implementing my keyword method with the word *muebles*. *Muebles* is both phonetically and visually similar to

the word “marbles” and means “furniture”. I told the kids to think of finding marbles in the cushions of their couches. Although they laughed at it, only one student missed that word on the test.

Before beginning keyword method, I obtained data on how students normally performed on vocabulary for two consecutive tests. Before beginning the keyword method, I surveyed the students on their attitudes towards the flashcards method (Appendix B). To determine what keywords to use with words, I followed the advice of Raugh and Atkinson (1975) and surveyed Spanish III students to obtain a consensus on a keyword. Based on Spanish III students’ responses to a survey (Appendix C), the most common keyword stated was chosen for inclusion in the presentation. On Friday, March 30th, I introduced students to the keyword method through a Keynote presentation (Appendices D and E). The keynote presentation for the first four days included both pictures and phrases to help the students learn the vocabulary and keyword method.

On day five, students viewed the keynote presentation without the pictures to aid them. On days six and seven, students viewed the keynote presentation with only the word in Spanish and the keyword to aid in recall. On days eight and nine, no additional information was given to students on the slide. Immediately after the presentation on day nine, students took a test that included the words in the presentation, as well as grammar topics from the chapter. Immediately after the test on day nine, students completed a short survey on the keyword method (Appendix F). All of this was done with the students of two Spanish II classes, who are introduced more clearly in the next section.

Membership of the Action Research Group

This study has been conducted in two high school Spanish II classes, taught by the same teacher. These classes are held daily in a high school of approximately 330 students in the rural Midwest. All students in the high school are equipped with Apple MacBook laptops, and they are used to using technology in the classroom. There are a total of 52 students in the Spanish II classes with 23 females and 29 males. All students range in age from 15 – 18. Most students are sophomores, with eight juniors and six seniors. There are a total of four students who have an Individualized Education Plan (IEP) and two students who are non-white. There are no native Spanish speakers in either of my Spanish II classes. In my fifth hour Spanish II class, I have 28 students with 15 girls and 13 boys. Three students have Individualized Education Plans (IEPs). In my seventh hour Spanish II class, I have 24 students with eight girls and 16 boys. One student has an IEP in that class.

These two classes perform equally in terms of their abilities in Spanish. All but two students have completed Spanish I in the course that I taught last year. The other two students took Spanish I the year before and had one year off in between Spanish classes. There are no associates in the classroom for either class. In general, all students in these classes come from small towns or rural areas within the school district. One student comes from the suburb of a large city. Before I began this study, I talked with these students, as well as others, for approval of the study.

Negotiations to be Undertaken

I first sought the approval of my building principal to perform the study with my students, and I immediately received it. I then completed the Human Subjects Training provided by Iowa State University. Finally, I informed the students of the study in which they would be participating. I explained to them the history of the keyword method and rationale for conducting the experiment, and I stated that any student unwilling to participate did not have to do so. No students opted-out of the study. These students were vital to many aspects of study, the timeline of which is outlined in the next section.

Timeline

This timeline reveals the major steps that were performed throughout the study on the keyword method. Each step performed led into the next one.

Table 1

Action Research Timeline

January 14 - 24	Identify area of focus and research question
February 5- March 18	Complete Literature Review
March 7 – 28	Compile data on current vocabulary method
March 28	Survey on current vocabulary method
March 30 – April 12	Conduct keyword method presentation in class
April 12	Survey on keyword method
April 13 – 25	Data Analysis, Comparison of findings, Action planning

Planning this timeline early in the process allowed for an extended amount of time to collect information and then analyze it to determine findings.

Data Collection and Analysis

Data Collection

Four different types of data were collected throughout this study. These four sources can be seen in the below table (Table 2).

Table 2

Triangulation Matrix

Research Question	Data Source #1	Data Source #2	Data Source #3	Data Source #4
How does repeated exposure to vocabulary via digital keyword method presentations impact students' retention of vocabulary words in a high school Spanish class?	Flashcard survey	Test scores before keyword method	Keyword method survey	Test scores after keyword method

For the first data source, students were given a survey as to how they felt flashcards helped them. This survey was created by the instructor to see the students' feeling of utility in regards to the flashcards, as well as to see their normal study habits in regards to vocabulary.

The next sources of data were test scores for the two previous tests before implementing the keyword method. The scores of the vocabulary portion were recorded for each student for the tests. These scores came from tests over Chapters 5A and 5B.

After the students were exposed to the keyword method, two sources of data were collected. The first of those was a survey over the keyword method, asking for students' opinions of the method, as well as their studying habits for that test. The

instructor also created this survey. Finally, the test scores for the vocabulary portion of this test, over Chapter 6A, were also recorded in the same manner as before.

Data Analysis

To analyze these data, I compared the results of the two surveys to each other. I counted and then charted the frequency of student responses to the question asking about how they study for the vocabulary portion of tests. Because students' studying habits also affect their test scores, this helped to answer my research question.

To analyze the scores of the tests, the mean of correct responses was found for each class (5th and 7th hour) to account for differences in classes. The mean was also calculated from all student scores. Following that, the standard deviation was also calculated for each test, both for each class and as a whole. I then compared the common pieces of data to determine differences in test scores. Using the responses from the surveys, test means, and standard deviations of test scores, the significance of the intervention was determined. This significance of the keyword method is further discussed in the findings section.

Findings

My first, and what I felt were the most important, findings come from students' scores on the last three tests. Tests from Chapters 5A and 5B were taught using the typical flashcard method of vocabulary acquisition. Chapter 6A was taught with the keyword method. Table 3 shows the results for the three tests.

Table 3

Vocabulary Test Scores for Students

	5th Hour Mean	5th Hour Standard Deviation	7th Hour Mean	7th Hour Standard Deviation	All Students Mean	All Students Standard Deviation
Chapter 5A Test	20.75	6.68	22.26	4.34	21.49	5.65
Chapter 5B Test	22.19	3.58	23.48	3.58	22.78	4.28
Chapter 6A Test	24.52	3.35	25.48	1.72	24.96	2.74

As the table shows, students scored on average two points higher on Chapter 6A vocabulary than on 5B vocabulary. The standard deviation between Chapters 5B and 6A also decreased for both classes, indicating that more students scored higher. Looking at Chapter 5A, all students averaged almost 3.5 points better on the 6A test. The standard deviation is also almost three points lower. These numbers indicate that a change in vocabulary acquisition may have contributed to increased retention and test scores.

To determine if outside factors played a role in the test scores, I administered a survey to the students asking about their vocabulary studying behaviors outside of the classroom. I asked them how they normally studied for a test before teaching them the keyword method, then also asked them how they studied for Chapter 6A where the keyword method was used. Table 4 provides a summary of their responses.

Table 4

Vocabulary Study Behaviors of Students

Study Method	Number of students using method on a typical test	Percentage of students using method on typical test	Number of students using method on Chapter 6A test	Percentage of students using method on Chapter 6A test
Study Guide	1	1.89%	2	3.85%
Flashcards	11	20.75%	9	17.31%
Memorize from Book	25	47.18%	12	23.07%
Say Words Aloud with Partner	3	5.66%	2	3.85%
Keyword Method	2	3.77%	21	40.38%
Don't Study	11	20.75%	6	11.54%

The numbers show a drastic increase in the use of the keyword method from a typical test to the Chapter 6A test, growing 36.61%. At the same time, reliance on the book decreased by 24.11%. This indicates that more students used the keyword method to study, and more students performed better on the test. Based on this information, I feel confident to report that the keyword method enhanced vocabulary retention for students and allowed them to perform better on Chapter 6A test.

To me, these findings are consistent with much of the research done on the keyword method. Both Atkinson (1975) and Thomas and Wang (1996) concluded that the keyword method, when used in conjunction with visual cues, aided in the retention of vocabulary. Several of my students informally commented throughout

class that they believed the pictures helped them to “see” the vocabulary better this time. Raugh and Atkinson (1975) also suggested that a committee be formed to build the keywords used. Many students agreed that the words chosen were good ones and did remind them of the word in Spanish. Finally, as Raugh and Atkinson (1975) as well as Thomas and Wang (1996) stated, it was important to have the keywords be the same for all students. If one student was struggling to remember a word, fellow students would be able to aid in recalling the keyword for them. These encouraging findings have led me to think about my next cycle of action research, which is detailed in the final section.

Action Planning

My intention for this study was to find a new vocabulary acquisition method that increased retention for my students. I also wanted my students to be more engaged in the process. Through this study, I feel that both my students and I have a better understanding of how vocabulary is acquired and what method works best for each student. My findings show that the keyword method is beneficial to student cognition and retention of Spanish vocabulary. As I’ve discussed with my students, the keyword method is not limited to use in Spanish class. I have encouraged my students to utilize the keyword method in any class where they need to learn new vocabulary.

I also plan to share my findings on the keyword method with the English and Special Education teachers at my school. I feel that these groups of people will be the ones most likely to appreciate the keyword method as an effective language acquisition tool and will be able to best utilize it in their own classrooms.

One unanticipated consequence of my research was the polarized opinions of my students regarding the new method. In my research, Hall (1988) found that students were generally very positive towards the keyword method, even if it did not help them to score better. This was not the case with my students. One result from my keyword survey (seen in Appendix G) was particularly interesting to me. Some students were extremely happy to start a new chapter using flashcards for vocabulary acquisition. Others were visibly upset that we were not using the keyword method presentations again. Because of this wildly varied reaction, my next area of interest is to explore these two different acquisition methods.

I would be interested in creating a study that allowed students to choose which acquisition method they prefer – either flashcard or keyword – and complete a guided practice with that method at the beginning of each class. I envision a classroom where some students are viewing a guided presentation on their computers, and other students are guided through the flashcard presentation with me. I would be interested to see how this blended, self-differentiated environment would alter retention of vocabulary. From my investigations, I have also seen the abilities of CALL technologies on acquisition of vocabulary, and would like to incorporate those into the classroom in some way.

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Appendix A. Research Matrix

Author	Title	Year	F L	T e c h	C o g	Voca b. Ret.	Summary
Elgort, Irina	Deliberate Learning and Vocabulary Acquisition in a Second Language	2011	X			X	AWESOME study. Conducted study on deliberate learning retention of vocabulary words. Found that words were recognized correctly and were added to long-term lexicon of participants. Concludes that deliberate learning is a good way to learn L2 vocabulary, other techniques will also enhance learning.
Rampton, Ben	Ritual and Foreign Language Practices at School	2002	X			X	Found that students were playing with their German words during recess and other classes, students enjoyed the sounds of the language and being able to talk so that other people didn't know what they were saying, was used as motivation to learn the language.
Abraham. Lee B.	Second-Language Reading Comprehension and Vocabulary Learning with Multimedia	2007	X	X	X	X	Studied the use of picture, written, aural glossaries on vocabulary retention. Prior research indicated picture, written, aural all together increase retention, study did not produce same results
Erbes, Stella; Micahel Folkerts, Chrstina Gergis, Sarah Pederson, and Holly Stiveres	Understanding How Cognitive Psychology Can Inform and Improve Spanish Vocabulary Acquisition in High School Classrooms	2010	X		X	X	School had mixed results on using cognitive building vocabulary instruction versus traditional instruction in learning and remembering vocab words. Main issue was use of two different teachers in the experiment.
Schmidt, Richard	Awareness and Second Language Acquisition	1993	X		X		Students must notice something in order to learn it, but not necessarily be the focus of what is learned. Things learned this way are fine, but students may not understand all of the rules. Understanding is better than noticing for retention. Provides examples of what students notice in an example classroom.
Raugh, Michael R. and Richard C. Atkinson	A Mnemonic Method for Learning a Second-Language Vocabulary	1975	X			X	Found that keyword method worked best at providing retention for students, over rehearsal method or a free choice that the participants used.
Nuessel, Frank	Recreational Problem-Solving Activities for Teaching Vocabulary in Elementary and Intermediate Spanish	1994	X		X	X	Contents that students best learn vocabulary through problems requiring them to use contextualization, visualization, diversification, and personalization. Recommends a series of activities that achieve this.
Meara, Paul	Vocabulary Acquisition: A neglected aspect of Language learning	1980	X		X		Discusses the keyword method as a good technique for vocabulary acquisition, states that people learning foreign language build only one lexicon with both languages in it, this leads to interference

							from L1.
Lawson, Michael J. and Donald Hogben	The Vocabulary-Learning Strategies of Foreign-Language Students	1996	X		X	X	Discusses the different learning strategies that L2 learners employ. Found that those who scored better on tests employed more strategies than those who scored poorly. Knowledge and use of many different strategies increased retention of words.
Kroll, Judith F. and Gretchen Sunderman	Cognitive Processes in Second Language Learners and Bilinguals: The Development of Lexical and Conceptual Representations		X		X	X	States that both L1 and L2 lexicons are firing when reading or speaking in L2, leading to interference and confusion. Speaking entirely in the language to students or utilizing TPR is shown to help in eliminating this interference.
Gathercole, Susan E.; Elvira V. Masoura	Contrasting Contributions of phonological short-term memory and long-term knowledge to vocabulary learning in a foreign language	2007	X		X	X	Wanted to see how memory retention affected learning new words. Found that students with a good base of knowledge were able to learn words/remember them better if they had a natural connection to make between new/old knowledge
Felder, Richard M. and Eunice R. Henriques	Learning and Teaching Styles in Foreign and Second Language Education	1995	X				Discusses the best teaching style to benefit all students. Encouraging memorization, linguistic discussion, and lots of visual aids to help.
Ellis, Nick C.	The Psychology of Foreign Language Vocabulary Acquisition: Implications for CALL	1995	X	X	X		Focuses on implicit versus explicit vocabulary acquisition, both types are important. Reading helps with implicit, imagery helps with explicit recall of words.
Chamot, Anna Uhl and Lisa Kupper	Learning Strategic in Foreign Language Instruction	1989	X		X		Learning strategies should be applied to help FLLs succeed. Tell students what new strategy is, why it's important, practice immediately after.
Groot, Peter J.M.	Computer Assisted Second Language Vocabulary Acquisition	2000	X	X			States that a person needs to know around 5,000 words to successfully read in an L2. Created a program called CAVOCA to aid in retention by employing several different strategies, including sentence circumlocution, dictionary definition, fill in the blank. Results were positive.
Grace, Caroline	Gender Differences: Vocabulary Retention and Access to Translations for Beginning Language Learners in CALL	2000	X	X		X	Used CALL to see if males and females benefitted differently from the vocabulary teaching method. Results found that males and females retained vocabulary at a similar rate, thanks to CALL.
Rüschhoff, Bernd and Markus Ritter	Computer Assisted Language Learning	2001	X	X			Calls for a complete overhaul to the traditional language classroom, views vocabulary instruction as unnecessary as students may use computers to look up the meanings of words in glosses. Not very helpful for my research.
Gu, Peter Yongqi	Vocabulary Learning in a Second Language: Person, Task, Context and Strategies	2003	X		X	X	Examines several strategies for vocabulary retention, both knowing and using words is important, in depth examination of flashcards and keyword method, interesting!
Chapelle, Carol	Technology and Second	2	X	X		X	States that when using CALL, the use of

A.	Language Acquisition	0 0 7					glosses and L1 dictionaries with pictures aids in the student's performances, also helps with retention of vocabulary.
Brown, Dale	What Aspects of Vocabulary Knowledge do textbooks give attention to?	2 0 1 1	X			X	Claims that there are 9! Different aspects to knowledge of a vocabulary word, research found that textbook materials only demonstrate two of the aspects, believes that supplementary materials are necessary to facilitate a deep learning of L2 vocabulary.
Brown, Thomas S. and Fred L. Perry Jr.	A Comparison of Three Learning Strategies for ESL Vocabulary Acquisition	1 9 9 1	X		X	X	Research done found that keyword-semantics strategy did the best at teaching vocabulary for student retention. Keyword and semantics alone also increased retention, both together were best. GOOD to look at for potential teaching method.
Salaberry, M. Rafael	The Use of Technology for Second Language Learning and Teaching: A Retrospective	2 0 0 1	X	X			Identifies the usefulness of video, audio, computer aided, CALL on foreign language acquisition. CAI section most pertinent to my research claims that CAI did not improve retention or enhance learning more than a non-CA instruction would.
Schmitt, Norbert	Review Article: Instructed Second Language Vocabulary Learning	2 0 0 8	X		X	X	Discusses the size of vocabulary needed to understand texts or have a conversation. Forming a meaning link is important, but elaboration is also important. Understanding patterns of words (ex. verbs end in certain letters) also helps with acquisition
Constantinescu, Andreea I.	Using Technology to Assist in Vocabulary Acquisition and Reading Comprehension	2 0 0 7	X	X			Claims that a person needs to know between 2,000 - 7,000 words to be fluent. Computer aided glossaries or computer aided software aids students in comprehension and vocabulary awareness.
Citron, James L.	Can Cross-Cultural Understanding Aid Second Language Acquisition? Toward a Theory of Ethno-Lingual Relativity	1 9 9 5	X		X		States that understanding cultural differences and viewing things from the foreign cultures perspective aids in learning a foreign language. Understanding of vocabulary helps. Research agrees with this claim.
Pressley, Michael, Joel R. Levin, James W. Hall	The Keyword Method and Foreign Word Acquisition	1 9 8 0	X		X	X	Conducted an experiment very similar to my own, to see if the keyword method increased retention of Spanish vocabulary over normal repetition method. The study had positive results, as the keyword method participants out-performed all others. Includes secondary experiments that could also be helpful.
Pressley, Michael	Children's Use of the Keyword Method to Learn Simple Spanish Vocabulary Words	1 9 7 7	X			X	Studied imposed keyword method in 2nd and 5th grade students. Found that students using the method recalled at least 90% more vocabulary than students who used no method.
Sagarra, Nuria and Matthew	The Key is in the Keyword: L2 Vocabulary Learning	2 0	X		X	X	Compared keyword method, rote memorization, and semantic mapping

Alba	Methods with Beginning Learners of Spanish	06					methods. Found that keyword provided the most retention, followed by rote memorization and then semantic. Revealed the keyword method should include only one-step or link, instead of several.
Atkinson, Richard.	Mnemonetchnics in Second-Language Learning	1975	X		X	X	Seems to be one of the first articles on the keyword method, states that it is important that more than one person chooses a keyword. A panel of people who know the foreign language works best in choosing the keywords.
Levin, Joel. R, Michael Pressley, Christine B. McCormick, Gloria E. Miller, Linda K. Shriberg	Assessing the Classroom Potential of the Keyword Method	1979	X		X	X	Conducted 6 experiments to see if keyword method could be successful in the classroom. Some experiments conducted with Spanish II students. Found in a few experiments that keyword method didn't change anything, other experiments found that it helped with learning and retention.
Thomas, Margaret H. and Alvin Y. Wang	Learning by the Keyword Mnemonic: Looking for the Long-Term Benefits	1996	X		X	X	Initial findings indicate that the keyword method does not improve long-term retention. The inclusion of pictures helped with some retention, although rates still expectedly decreased more than normal rote memorization.
Campos, Alfredo, María Angeles González and Angeles Amor	Limitations of the Mnemonic-Keyword Method	2003	X			X	Examined effect of keyword method vs. rote memorization vs. keyword with provided photos. Showed the rote memorization provided the best long-term retention. Keyword with picture was better than keyword alone.
Hall, James W.	On the Utility of the Keyword Mnemonic for Vocabulary Learning	1988	X			X	Found that keyword with generated words did not fair any better/worse than user generate words. Keyword method did not increase retention over other methods. Subjects enjoyed the keyword method and stated they would use it again in other situations
Wyra, Mirella, Michael J. Lawson, Njora Hungi	The mnemonic keyword method: the effects of bidirectional retrieval training and of ability to image on foreign language vocabulary recall	2007	X		X	X	Study showed that when students were informed deeply on how to use the keyword method, as well as prepped for how to create quality mental images, their ability to recall vocabulary increased greatly.
Paivio, Allan and Alain Desrochers	Mnemonic Techniques in Second-Language Learning	1981	X		X	X	Reviewed the keyword and hook methods. Keyword method provides benefits regardless of age, although works best with concrete images. Hook method utilizes a number system, works but is extremely complex to learn.
Lawson, M. J. and D. Hogben	Learning and Recall of Foreign Language Vocabulary: Effects of a keyword strategy for immediate and delayed recall	1998	X		X	X	Found students who utilized the keyword method for both concrete and abstract words performed better on immediate and delayed recall tests.

Appendix B. Partial Keyword Generation Survey for Spanish III Students

I am currently enrolled in a class at Iowa State in which I am conducting a research project with my Spanish II students. I am doing research on something called the keyword method of acquiring vocabulary. In the keyword method, words and pictures are used to connect a Spanish word to a word that it looks similar to in English. For example: the word "muebles" in Spanish looks and sounds like "marbles" in English. "Muebles" means furniture, so a way to learn the meaning is to think about marbles stuck in a couch. Another example that we have used is "playa" when we say there are a lot of players at the beach.

For this part of the research, I am asking for you to tell me what word in English looks like the given word in Spanish. There's no need to connect to a definition, just tell me a word in English that LOOKS similar. You can also write "cognate" if you believe it is a cognate, or just skip if you cannot think of a word.

Your responses will help me to create the keywords for Spanish II, as well as be included in my final report.

Thanks so much for your help!!

aficionado

al final

campeón

campeonato

competencia

empate

entrenador

jugador

liga

meter un gol

Appendix C. Flashcards Survey for Spanish II Students

Flashcards Survey

Please answer the following questions about flashcards.
























How much do flashcards help you to learn the vocabulary for a chapter?


















- ☐ Flashcards help a lot.
- ☐ Flashcards help some.
- ☐ Flashcards help a little.
- ☐ Flashcards do not help.

Typically, how much do you pay attention during flashcards?

- ☐ I typically pay attention through all of the flashcards
- ☐ I typically pay attention through most of the flashcards
- ☐ I typically pay attention through about half of the flashcards.
- ☐ I typically pay attention through less than half of the flashcards.
- ☐ I typically don't pay attention during flashcards

Describe how you usually study for the vocabulary portion of a test:

<p>Chapter 6A Vocabulary</p> <p>Spanish II</p> <p>1</p>	<p>fenomenal</p> <p>phenomenal</p>  <p>2</p>	<p>al final</p> <p>Finally, it was the end of the school day.</p> <p>AT THE END</p>  <p>3</p>	<p>último, -a</p> <p>Ultimate, last, final</p>  <p>4</p>
<p>morirse</p> <p>The family mourned when Michael Jackson died.</p> <p>TO DIE</p>  <p>5</p>	<p>el/la atleta</p> <p>athlete</p>  <p>6</p>	<p>aburrirse</p> <p>I got bored while eating a burrito.</p> <p>TO GET BORED</p>  <p>7</p>	<p>meter un gol</p> <p>I met the player who scored the goal.</p> <p>TO SCORE A GOAL</p>  <p>8</p>
<p>el comentario</p> <p>Charles Barkley made some funny comments in his commentary.</p> <p>COMMENTARY</p>  <p>9</p>	<p>volverse loco</p> <p>The dude with the revolver went crazy.</p> <p>TO GO CRAZY</p>  <p>10</p>	<p>ponerse + adjective</p> <p>The ponies became magical!</p> <p>TO BECOME</p>  <p>11</p>	<p>la competencia</p> <p>Competition</p>  <p>12</p>
<p>perder</p> <p>The pear lost its color.</p> <p>TO LOSE</p>  <p>13</p>	<p>agitado, -a</p> <p>agitated</p>  <p>14</p>	<p>el auditorio</p> <p>auditorium</p>  <p>15</p>	<p>la reina</p> <p>The queen reigned over the country.</p> <p>QUEEN</p>  <p>16</p>
<p>emocionado, -a</p> <p>Emotional, excited</p>  <p>17</p>	<p>furioso, -a</p> <p>furious</p>  <p>18</p>	<p>el concurso de belleza</p> <p>Belle won the beauty contest.</p> <p>BEAUTY CONTEST</p>  <p>19</p>	<p>jugador</p> <p>The players hugged.</p> <p>PLAYER</p>  <p>20</p>
<p>el presentador</p> <p>presenter</p>  <p>21</p>	<p>enojado, -a</p> <p>I enjoy it when you are angry.</p> <p>ANGRY</p>  <p>22</p>	<p>resultar</p> <p>to result, to turn out</p>  <p>23</p>	<p>el aficionado</p> <p>The fan had a lot of affection for his favorite team.</p> <p>FAN</p>  <p>24</p>

<p>enojarse</p> <p>I enjoy when you get angry.</p> <p>TO GET ANGRY</p>  <p>25</p>	<p>el campeonato</p> <p>After the championship, Eli went camping.</p> <p>CHAMPIONSHIP</p>  <p>26</p>	<p>un millón de</p> <p>a million of</p>  <p>27</p>	<p>entrevistar</p> <p>She entered the room to interview the candidate.</p> <p>TO INTERVIEW</p>  <p>28</p>
<p>dormirse</p> <p>We fell asleep in the dorm room.</p> <p>TO FALL ASLEEP</p>  <p>29</p>	<p>el campeón</p> <p>champion</p>  <p>30</p>	<p>el empate</p> <p>The crowd was impatient with the tie game.</p> <p>TIE</p>  <p>31</p>	<p>alegre</p> <p>I was happy when my allergy went away.</p> <p>HAPPY</p>  <p>32</p>
<p>competir</p> <p>to compete</p>  <p>37</p>	<p>el premio</p> <p>My prize rib got first prize.</p> <p>PRIZE</p>  <p>38</p>	<p>el entrenador</p> <p>Coach Rhoads took the train to the game.</p> <p>COACH, TRAINER</p>  <p>39</p>	<p>por ... vez</p> <p>For the hundredth time, you need to pour water in the vase!</p> <p>FOR THE...TIME</p>  <p>40</p>
<p>la liga</p> <p>league</p>  <p>37</p>	<p>la entrevista</p> <p>She entered the room for the interview.</p> <p>INTERVIEW</p>  <p>38</p>	<p>el tanteo</p> <p>The score taunted the fans of the losing team.</p> <p>SCORE</p>  <p>39</p>	<p>aplaudir</p> <p>To applaud</p>  <p>40</p>
<p>el público</p> <p>The audience went to the pub after the game.</p> <p>AUDIENCE</p>  <p>37</p>			

Appendix E. Close-Up Example of Keyword Presentation Slide

el campeonato

After the championship, Eli went **camping**.

CHAMPIONSHIP



Appendix F. Keyword Method Survey

Keyword Survey

Please answer the following questions about the keyword method.

How much did the keyword method presentation help you to learn the vocabulary for a chapter?

- ☐ The keyword presentation helped a lot.
- ☐ The keyword presentation helped some.
- ☐ The keyword presentation helped a little.
- ☐ The keyword presentation did not help.

How much did you pay attention during the keyword presentation during this unit?

- ☐ I typically paid attention through the entire presentation.
- ☐ I typically paid attention through most of the presentation.
- ☐ I typically paid attention through half of the presentation.
- ☐ I typically paid attention through less than half of the presentation.
- ☐ I typically did not pay attention during the presentation.

For this most recent test, how did you study for the vocabulary portion?

Appendix G: Student Responses to Keyword vs. Flashcard Methods

